DOCUMENT RESUME

ED 467 952 IR 021 472

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TITLE	An Online Writing Support Initiative for First-Year Information Technology Students.
PUB DATE	2001-12-00
NOTE	10p.; In: Meeting at the Crossroads. Proceedings of the Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE 2001) (18th, Melbourne, Australia, December 9-12, 2001); see IR 021 433.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	*Citations (References); College Freshmen; *Computer Science Education; Computer Uses in Education; Courseware; Foreign Countries; Higher Education; Information Technology; Instructional Design; *Material Development; *Web Based Instruction; World Wide Web; *Writing Skills
IDENTIFIERS	Monash University (Australia)

ABSTRACT

A perennial difficulty for first year students--one often viewed by them as an unimportant annoyance--is the need to handle sources and cite correctly. Any serious institutional attempt to address this issue in an interesting way is an enterprise concerned with motivation, as well as curriculum innovation. This paper reports on a collaboration between language and learning staff and a Computer Science subject leader at Monash University (Australia) to develop a World Wide Web-based tutorial that provides tools for students to use to develop skills in using sources. The tutorial seeks to provide online learning support for interpreting an information technology assignment topic, extracting information from sources, and integrating the material into a report with the support of online lexical tools. The project's origins lie in the evidence from previous years' experience that first-year students find this a particularly challenging task. Results of a diagnostic assessment of 30 first-year computer science reports are appended. (Contains 11 references.) (Author/MES)

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AN ONLINE WRITING SUPPORT INITIATIVE FOR FIRST-YEAR INFORMATION TECHNOLOGY STUDENTS

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Abstract

A perennial difficulty for first year students – one often viewed by them as an unimportant annoyance – is the need to handle sources and cite correctly. Any serious institutional attempt to address this issue in an interesting way is an enterprise concerned with motivation, as well as curriculum innovation. This paper reports on a collaboration between language and learning staff and a Computer Science subject leader to develop a web-based tutorial which provides tools for students to use to develop, inter alia, skills in using sources. The tutorial seeks to provide online learning support for interpreting an IT assignment topic, extracting information from sources, and integrating the material into a report with the support of online lexical tools. The project's origins lie in the evidence from previous years' experience that first-year students find this a particularly challenging task.

Keywords

web-based learning, instructional design, information technology, academic study skills

Introduction

As Drury (1997) claims, to produce quality courseware which will develop students' writing skills, the two issues of "authenticity" and "integration of computer-based tasks" are paramount. To assist students to use referencing conventions appropriately, interpret assignment topics and respond to exam questions a web resource has been developed by Language and Learning Services in collaboration with the School of Computer Science and Software Engineering. The resource provides web-based activities which draw attention to the ways ideas are organized and presented in academic texts, with a special emphasis on the discipline of Information Technology.

For language and learning staff to feel confident that the materials were authentic, intensive collaboration with the subject specialist was essential. This involved actual assignment tasks, selection of student work and source texts to use as examples in the interactive exercises, and developing a suitable computing corpus for the concordancer, as outlined below. The students access the resource by clicking on a link on the subject page, they can see at a glance that all the tasks relate to their subject, and they can link back to a discussion forum moderated by the subject leader. They can also link to a language and learning site, the Online Student Resource Centre. A significant aspect of the collaboration was the discussion and consultation about the design of the

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website, and what the student group would find most helpful in terms of lexical tools. Formative evaluation of the web resource was provided by a project reference group, language and learning colleague peer review, CSE1200 tutor review, user surveys and a student discussion list. Summative evaluation of student learning outcomes is currently being conducted and will be reported in a future paper.

The Problem

Lecturer and Student Perceptions

At Monash University the subject leader of a first-year Information Technology subject, Computer Systems, observed a number of common areas of difficulty faced by students completing a research assignment and exams. These areas of difficulty were identified as using referencing conventions appropriately, plagiarism from electronic sources, interpreting assignment topics and responding to exam questions. The subject leader suggested a number of possible underlying causes of these difficulties. Most students seemed unfamiliar with referencing conventions which was particularly evident for electronic sources. This may in part be due to the nature of the subject – a dynamic technical subject for which books provide limited – and usually out-of-date information. Electronic sources were therefore the most common source of information for the assignment. The subject leader attributed an increasing emergence of plagiarism, at least in part, to the reliance upon electronic sources. It was common for assignments to be submitted with large chunks of plagiarised text linked by the occasional student comment and retaining the commercial style of the source material rather than the academic style of a report.

Overseas students, who comprise approximately 40% of the student cohort, had difficulty in understanding exactly what was required in both the assignment specifications and exam questions. A recurring problem with overseas students (addressed by the resource, but not dealt with in this paper) was the inappropriate presentation of prepared answers for exam questions from previous exams. It appeared that these students were not reading the question on the current exam carefully but were focussing on the use of similar key words from past exam questions.

Academic writing in Computer Science may be an unexpected surprise for the first-year students. Many first-year students, fresh from school, are only barely aware – if at all – that there are different sections of a research paper; that different citation styles exist; and, more abstractly, that knowledge is constituted differently in different disciplines?

Research in the more practical areas of Information Technology too involves consultation of web sources, which may be refereed journal articles, e-zines produced by corporations or simply advertising material. If students learn from models, as we assume they do, then they are exposed to a dizzying array, the questionable value of which may not be clear to them. Where they are required in their subjects to "evaluate" their sources, they may not be sure how to approach this, and lacking models in the texts themselves, may literally not have any idea how to integrate the sources into their own text.

Students undertaking Computer Systems were surveyed early in first semester 2000 about their perceptions of their research and writing skills in relation to the assessment tasks of the subject. Interestingly, only 17-18% of students thought that "using quotations in assignments" and "referencing – in assignment and bibliography" was difficult or very difficult. Only one-quarter of the students thought they needed help with these tasks. This flies in the face of the course leader's experience that every year students demonstrate that they do not understand the conventions or the reasons underlying them. This is a common experience in first year (Clerehan, Moore & Vance, 2000), partly produced by the conditions associated with Year 12 study. It may be hypothesised that, if new students across the spectrum of the "essay-writing faculties" are not well-equipped to deal with integrating sources, the first-year computer science and software engineering student is likely to be less so.

Other explanations for this conflict of perception are that students may be less focussed on the assignment (worth 15%) than the exam (worth 70%), or may have not wanted to admit difficulty. Perhaps a more plausible explanation is that many, coming in from Year 12, were either not aware of what referencing involves or thought it of little importance, based on past experience. After completing the assignment and receiving their mark, students are more aware – in a number of cases painfully so – that confusion exists in their minds regarding the precise task requirements.

Assessment of Referencing Problems

The perceptions of the subject leader that the act of referencing sources was a major problem were confirmed in the results of a survey conducted by the language and learning lecturer in conjunction with the subject lecturer. A sample of 30 reports was drawn from across all grades. A modified version of a diagnostic assessment instrument developed to create "a literacy profile" for a cohort of students by the Learning Assistance Centre at the University of Sydney was deployed (Bonanno & Jones, 1997). Our instrument was developed in close collaboration with the subject leader to reach a consensus on valued characteristics associated with the assignment topic. The assessment criteria were then categorised into three main areas: selection of source material, integration of facts and ideas from source material, and referencing conventions (see Appendix A). The criteria were rated on a scale of 1–4, where 1–2 indicated serious problems, an inappropriate response, and 3–4 indicated a predominantly accurate response, or in other words an appropriate response.

Overall, the results of the assessment indicated the selection of source material (A) presented fewer difficulties for students than the integration of information from source material (B) and the implementation of referencing conventions (C). The latter two criteria were rated as inadequately met in the majority of reports examined (see Appendix A).

Criteria	Frequency No.	%
C. Presents the Bibliography and/or List of References using an appropriate format	22	73%
C. Presents correct in-text citation format (using Harvard or Footnote style)	18	60%
B. Clearly distinguishes facts and opinions found in the reference material from own views and assumptions	17	57%
B. Supports claims with references	16	53%
B. Presents summarised or paraphrased information appropriately to avoid plagiarism	16	53%
B. Uses appropriate academic language and style to present and discuss reference material	15	50%
C. Presents quotations in the text with quotation marks or indentation as appropriate	13	44%
A. Uses references relevant to the topic	12	40%
A. Uses references from a range of journals/texts	11	37%
A. Uses up-to-date references	10	33%
A. Uses references from a reputable source	9	30%
B. Integrates quotations into the discussion	8	27%
B. Selects appropriate information to quote	5	17%

Table 1: Frequency of criteria rated as inappropriately met

Table 1 shows the frequency of criteria rated as inappropriately met. The data indicate that the following of referencing conventions in terms of presenting a bibliography and/or a list of references (73%) and in-text citations (60%) were the most challenging aspects of citing for students. This may in part be attributed to confusion between in-text or footnote forms of citing; both options were provided to the students. As previously stated, a lack of familiarity with academic style in combination with the variety of citation models the students were exposed to in web sources may have also contributed to this result. These sources ranged from refereed journal articles to online magazines and even advertising material. Without explicit guidelines as to which model to follow, students appeared to make inappropriate choices.

Despite the majority of reports displaying an appropriate selection of references in relation to the criteria of currency, relevance, authority and a range of sources, there was a small percentage of reports with major problems due to either inaccurate citations in the bibliography or the absence of a bibliography entirely. The citation of web sites presented challenges to the students, with many students simply providing the URL for a site referred to.

Characteristics associated with the integration of facts and ideas from source material were identified as the next most frequent area of difficulty. These criteria were inadequately met in approximately half the reports. An inability to distinguish facts and opinions found in source material from the writer's own views occurred in 57% of the reports. This was primarily due to the absence of citations for sources referred to in a report. Related to this was the finding that 20% of the reports examined included no citations at all, although this was an integral part of the assignment. This accounts for the lower frequency of occurrence for the integration of quotations into the discussion (27%) and the selection of appropriate information to quote (17%), and contributed to the occurrence of plagiarism, in one of its many forms, in 50% of the reports. There was limited evidence in the reports of questioning the knowledge or opinions referred to; instead students presented information from source material as a statement of accepted fact. This may be a reflection of the style of citing which typifies the discipline (Hyland, 1999). However, it also concurs with the findings of Buckingham and Nevile (1997) in a study comparing the use of citations in 20 first year political science essays with that of experienced writers, suggesting that this may also relate to a lack of familiarity and experience with academic style.

Implications for the Design of the Tutorial

The assessment of referencing problems assisted in the planning and development of the tutorial by suggesting that the content of the study skills tutorial on *Using Sources in Assignments* should specifically focus on the implementation of referencing conventions and the integration of information from source material. More specifically the assessment appeared to indicate that referencing conventions, both in terms of the reference list and intext citations, needed to be explicitly modelled for a variety of sources; for example, monographs, periodicals and web sites. A clear distinction needed to be made between in-text and footnote forms of citing, possibly specifying a preferred style in the assignment description. Focus on the language of reporting and evaluating evidence, and explicitly defining plagiarism also appeared to be necessary to address the limited ability of many students to distinguish facts and opinions found in source material from the students' own views. Further areas of difficulty identified by the subject leader such as interpreting an assignment topic and responding to exam questions were addressed in other sections of the tutorial. An online mode of delivery was considered the most appropriate mode to meet the needs and interests of an audience of IT students, and also enabled the tutorial to be linked to the subject home page.

The Online Tutorial

Perhaps the most innovative aspect of these activities is the way in which lexical tools – three online dictionaries and a concordancer – have been integrated with a variety of activities to further develop effective academic study skills. The design of the web resource is centred around three separate academic study skills tutorials: 1. Starting the Assignment, 2. Using Sources in Assignments, and 3. Analysing and Responding to Exam Questions.

All tutorials are designed specifically to support first-year undergraduates enrolled in the Information Technology subject, Computer Systems. In this subject, students are required to complete a 1500-2000 word report assessing the current state of an area of computer technology, as their first assignment. The assignment requires students to consult recently published information from a range of periodicals or web sites and to consider the reliability and relevance of the information used. Students are explicitly instructed to summarise the opinion of experts in the field, acknowledge the sources of these opinions and to avoid plagiarism. As a measure to

discourage plagiarism, students are instructed to attach an appendix consisting of photocopies or printouts of three of their most frequently used references.

The activities in tutorials 1 and 2 draw on authentic discipline-specific texts related to the assignment topic, relevant readings and student writing. The objective of these learning activities is to equip students with appropriate and "transferable" strategies for analysing an assignment topic, writing a report, extracting relevant information from sources, integrating this information into the student's text, and using appropriate referencing conventions.

The introduction to *Using Sources in Assignments* (see Figure 1) attempts to draw the students' attention to the importance of using sources appropriately and directs students to sections within the tutorial which address the referencing problems identified. The activities in these sections are supported by a range of online lexical tools which provide students with further models of referencing practice.

Figure 1: Using sources in assignments

The Deployment of Web-based Lexical Tools

The integration of electronic lexical tools with academic study skills activities was adopted in the web resource with the aim of facilitating the learner's concurrent development of fluency in writing, reading and referencing skills. Within the context of the primary focus on study skills development, extended activities were developed which involve exploring new vocabulary to develop a better understanding of word meaning and use in a variety of different contexts.

Online Dictionaries

Two online dictionaries were selected, for native and non-native speakers: the Macquarie and the Cambridge International. Access to a subject specific dictionary in the discipline of Computing was considered essential for students to examine terminology related to the field. A third online dictionary, Webopedia, was therefore selected for this purpose by the subject leader. Figures 2 and 3 illustrate the interface design for the integration of the online dictionaries within the tutorial. In the accompanying activity students are encouraged to read through the assignment topic on the left and explore whether they will get a better result from looking up a word in a general dictionary or a subject-specific dictionary. By encouraging the use of the online dictionaries a student is able to learn more about meaning – or disambiguate – and they can also compare discipline-specific meanings with general meanings.

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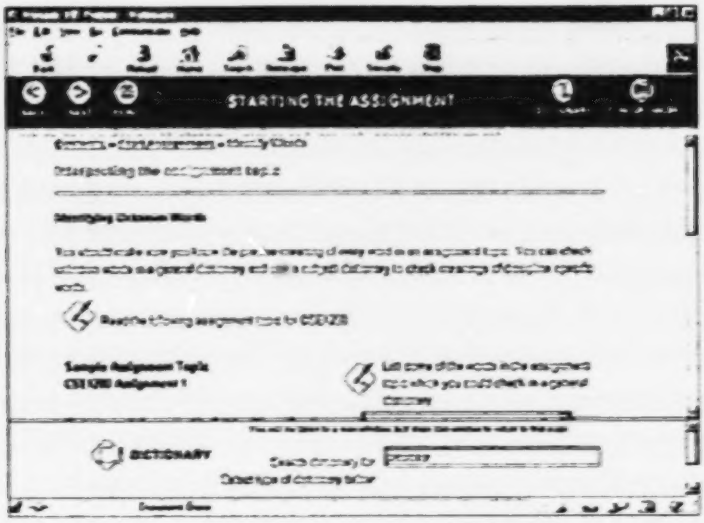

Figure 2: Interface design for an online dictionary within the tutorial

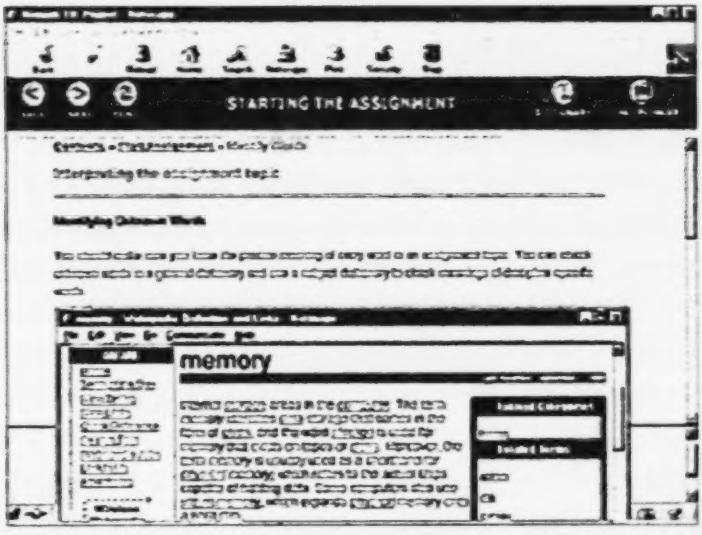

Figure 3: Interface design for an online dictionary entry within the tutorial

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The Concordancer

A concordancer performs the relatively simple function of searching texts in a corpus to find all occurrences of a selected keyword or phrase in that corpus. It can provide multiple examples of the different contexts in which a word is used. It is a very useful tool for language development as it enables systematic study of the meanings and use of words (including discipline-specific terminology) in authentic contexts (Johns 1991; Hadley, 1997; Milton, 1999). The use of a concordancer in our web-based learning resource follows the lead of Chris Greaves (1999) of Hong Kong Polytechnic University, who has developed an integrated platform for general English language learning in his Virtual Language Centre (VLC).

Using a similar approach to the selection of the online dictionaries for the tutorial, two corpora were established for use with the concordancer: a general academic corpus and a Computer Science corpus. Students are thus able to examine both discipline-specific academic English as well as more general aspects of academic English across a range of disciplines. The general academic corpus was compiled from selected academic English corpora from the ICAME corpus collection of American, British and Australian English. The computer science corpus was compiled from electronic academic journals selected in collaboration with the subject leader.

From previous experience in using a concordancer with students it was recognised that many students would be unfamiliar with concordance investigations, and would require clear guidelines on what to search for and how to analyse the concordance data (Stevens, 1991; Turnbull & Burston, 1998). The learning activities were therefore written with this in mind and provided implicit guidance as to the appropriate use of the concordancer. An online help tutorial to assist students to independently use the concordancer for their individual linguistic investigations was also provided for interested students to further investigate the use of the concordancer. Figures 4 and 5 demonstrate the concordancer interface and an example search generated to provide models of in-text citations and reporting language. The original source paragraphs for the concordance items identified can also be accessed by students to examine the context of a phrase.

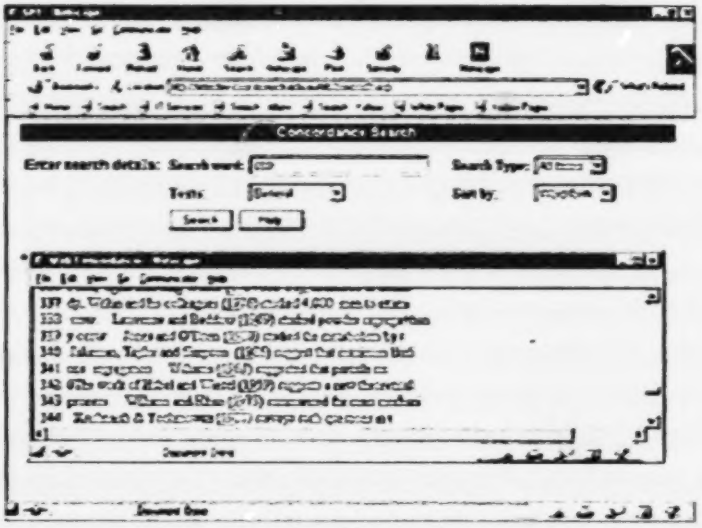

Figure 4: Interface design of web concordancer and overlay of example search

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Figure 5: Context for selected concordance token

Conclusion

The collaboration of language and learning staff and the subject specialist has led to the development of a web tutorial which, among other things, addresses student uncertainty about selecting source material, implementing referencing conventions and integrating facts and ideas from source material. Although the specific content of the web tutorials targets first-year students enrolled in the subject, Computer Systems, it is expected that many other students will benefit from the learning activities, particularly those which focus on the integration of sources. Furthermore, as the lexical tools will also operate as "stand-alone" tools for self-directed language learning, it is expected that this innovative aspect of the resource will be of particular benefit to international and non-English speaking background students. In order for students to gain maximum value from the resource, it is important that the lexical tools are fully contextualised so that students can see how they can make use of them and become self-directed in other writing contexts as well.

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Appendix A:
Results of a Diagnostic Assessment of 30 First Year Computer Science Reports.

Diagnostic assessment of 30 first year computer science reports.				
Criteria	Appropriate		Inappropriate	
%	(No.)	%	(No.)	
A. Selection of Source Material				
• Uses up-to-date references	67%	(20)	33%	(10)
• Uses references relevant to the topic	60%	(18)	40%	(12)
• Uses references from a range of journals/texts	63%	(19)	37%	(11)
• Uses references from a reputable source	70%	(21)	30%	(9)
B. Integration of Facts and Ideas from Reference Material				
• Selects appropriate information to quote	63%	(19)	17%	(5)
• Integrates quotations into the discussion	53%	(16)	27%	(8)
• Presents summarised or paraphrased information appropriately to avoid plagiarism	44%	(13)	53%	(16)
• Supports claims with references	47%	(14)	53%	(16)
• Clearly distinguishes facts and opinions found in the reference material from own views and assumptions	43%	(13)	57%	(17)
• Uses appropriate academic language and style to present and discuss reference material	50%	(15)	50%	(15)
C. Referencing Conventions				
• Presents quotations in the text with quotation marks or indentation as appropriate.	33%	(10)	44%	(13)
• Presents correct in-text citation format (using Harvard or Footnote style)	40%	(12)	60%	(18)
• Presents the Bibliography and/or List of References using an appropriate format	27%	(8)	73%	(22)

1. 20% of the reports examined did not include citations and are therefore not included in these figures
2. 3% of the reports included direct quotes only and are therefore not included in these figures
3. 23% of the reports included indirect quotations only and are therefore not included in these figures

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